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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/880,632	06/12/2001	Wenting Tang	HP-10012351	5911

7590 04/20/2005

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EXAMINER

TODD, GREGORY G

ART UNIT PAPER NUMBER

2157

DATE MAILED: 04/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/880,632

Applicant(s)

TANG ET AL.

Examiner

Gregory G Todd

Art Unit

2157

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 December 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. This is a second office action in response to applicant's amendment filed, 22 December 2004, of application filed, with the above serial number, on 12 June 2001 in which claims 3, 5, 17, and 22 have been amended. Claims 1-29 are therefore pending in the application.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-29 are rejected under 35 U.S.C. 102(e) as being anticipated by Albert et al (hereinafter "Albert", 6,775,692).

Albert teaches the invention as claimed including TCP request forwarding and monitoring (at least Abstract).

As per Claim 1, Albert teaches a communication network, a method of TCP state migration comprising the steps of:

a) establishing a communication session between a client and a front-end node at a first bottom TCP (BTCP) module located below a first TCP module in a first

Art Unit: 2157

operating system at said front-end node, said front-end node accessing a plurality of back-end web servers forming a web server cluster that contains content (at least col. 7, lines 36-60; forwarding agents connecting client/servers);

b) receiving a HTTP request from said client at said first BTCP module (at least col. 15 line 36 - col. 16 line 15; col. 8, lines 17-25; http from client);

c) parsing said HTTP request to determine which back-end web server, a selected back-end web server, in said plurality of back-end web servers can process said HTTP request, said selected back-end web server not said front-end node (at least col. 9, lines 10-34, 45-58; service manager detailing load balancing);

d) extending said communication session to said selected back-end web server by handing-off an initial TCP state of said first BTCP module to said selected back-end web server (at least col. 14 line 65 - col. 15 line 27; SYN/ACK packets);

e) sending said HTTP request to said selected back-end web server (at least Fig. 5; data to host/server);

f) switching a bottom IP (BIP) module at said front-end node to a forwarding mode, wherein packets received at said BIP module from said client are forwarded to said selected back-end web server, said BIP module located below an IP module at said front-end node (at least Fig. 5; col. 14, lines 1-15; forwarding data packet); and

g) terminating said communication session at said front-end node after said HTTP request is fully processed (at least col. 32, lines 46-63; connection ends).

As per Claim 2, the method as described in Claim 1, wherein said content is partially replicated between each of said plurality of back-end web servers (at least col. 3, lines 22-57; clustered servers).

As per Claim 3, the method as described in Claim 1, wherein said back-end web server includes a second BTCP module that is located below a second TCP module in a second operating system at said selected back-end web server (at least Fig. 3; col. 11 line 30 - col. 12 line 5).

As per Claim 4, the method as described in Claim 1, wherein said initial TCP state is associated with said communication session, said communication session established for the transfer of data contained within said content to said client (at least Fig. 5; col. 12, lines 22-35; TCP connection).

As per Claim 5, the method as described in Claim 4, wherein said step d) comprises the further steps of:

 sending a SYN packet to said selected back-end web server (at least col. 12 line 23 - col. 13 line 51),

 said SYN packet intercepted by a second BTCP module (at least col. 12 line 23 - col. 13 line 51; received by forwarding agent),

 said SYN packet originally sent from said client to said front-end node in requesting said communication session (at least col. 12 line 23 - col. 13 line 51),

 said SYN packet stored at said first BTCP module (at least col. 12 line 23 - col. 13 line 51);

including an initial sequence number within said SYN packet that enables said second BTCP module to understand proper TCP state of said first BTCP module said communication session (at least col. 12 line 23 - col. 13 line 51; col. 19, lines 12-15);

receiving a SYN/ACK packet from said selected back-end web server, said SYN/ACK packet updated by said second BTCP module to reflect said proper TCP state of said first BTCP module (at least col. 12 line 23 - col. 13 line 51); and

sending an ACK packet from said first BTCP module to said selected back-end web server, said ACK packet originally sent from said client to said front-end node in establishing said communication session (at least col. 12 line 23 - col. 13 line 51; TCP connection being established between the client, forwarding agent and server).

As per Claim 6, the method as described in claim 1, wherein said method comprises the further step of:

sending response packets from said selected back-end web server to said client in a communication path that does not include said front-end node by changing headers of said response packets such that it appears that the source of said response packets is said first BTCP in its proper TCP state (at least col. 7 line 60 - col. 8 line 11; modifying addresses in header).

As per Claim 7, the method as described in Claim 1, wherein step g) comprises the further steps of:

intercepting TCP control packets from a second TCP module located at said selected back-end web server at said second BTCP module (at least Fig. 13; col. 12

line 23 - col. 13 line 51; col. 32, lines 46-63; TCP connection ending between the client, forwarding agent and server);

sending said TCP control packets to said first BTCP module from said second BTCP module (at least Fig. 13; col. 12 line 23 - col. 13 line 51; col. 32, lines 46-63; TCP connection ending between the client, forwarding agent and server);

sending said TCP control packets to said client from said first BTCP module (at least Fig. 13; col. 12 line 23 - col. 13 line 51; col. 32, lines 46-63; TCP connection ending between the client, forwarding agent and server); and

terminating said communication session at said front-end node and said back-end web server (at least Fig. 13; col. 32, lines 46-63; connection ends).

As per Claim 8, the method as described in Claim 1, wherein said front-end node and said plurality of back-end web servers comprise a web site, said front-end node providing a virtual IP address for said web site (at least col. 28, lines 34-38; col. 4, lines 43-52; col. 9, lines 45-58; web virtual IP addresses).

As per Claim 9, the method as described in claim 8, wherein said front-end node, and said plurality of back-end web servers are coupled together by a local area network (at least Fig. 2; col. 7, lines 37-60).

As per Claim 10, the method as described in Claim 8 wherein said front-end node and said plurality of back-end web servers are coupled together by a wide area network (at least Fig. 2; col. 7, lines 37-60).

As per Claim 16, the method as described in Claim wherein said TCP control packets include a RST flag and a FIN flag (at least col. 28, lines 34-43).

As per Claim 17, wherein said method bypasses the first TCP module (at least col. 7 line 60 - col. 8 line 11; Fig. 2).

As per Claim 21, the method as described in Claim 11, wherein said content is partitioned between each of said plurality of back-end web servers (at least col. 3, lines 22-57; clustered servers).

As per Claim 22, Albert teaches a communication network for TCP state migration comprising:

- a client (at least Fig. 2);

- a front-end node coupled to said client by said communication network, said front-end node including a front-end bottom TCP (BTCP) module located below a front-end TCP module in a first operating system, and a bottom IP (BIP) module located below an IP module in said first operating system (at least Fig. 2); and

- a plurality of back-end web servers including a selected back-end web server, said plurality of back-end web servers containing content that is partitioned between each of said plurality of back-end web servers, each of said plurality of back-end web servers coupled to said front-end node through said communication network, each of said plurality of back-end web servers including a back-end bottom TCP module located below a back-end TCP module (at least Fig. 2; col. 3, lines 22-57 col. 7, lines 36-60; clustered servers connected to forwarding agent).

As per Claim 23, the communication network as described in Claim 22, wherein said front-end BTCP module establishes a communication session with said client for

the transfer of data contained within said content to said client (at least Fig. 5; col. 8, lines 26-61; TCP connection transfers data).

As per Claim 24, the communication network as described in Claim 23, wherein said front-end BTCP module parses a HTTP request from said client in order to determine which of said plurality of back-end web servers, a selected back-end web server, contains said data in order to process said HTTP request node (at least col. 9, lines 10-34, 45-58; service manager detailing load balancing).

As per Claim 25, the communication network as described in Claim 23, wherein said front-end BTCP module extends said communication session to said selected back-end web server by handing-off an initial TCP state of said front-end BTCP module to a second BTCP module located at said selected back-end web server, said initial TCP state associated with proper TCP state for said front-end BTCP module in said communication session, said front-end BTCP module further forwarding packets, including said HTTP request, from said client after successfully handing-off said initial TCP state (at least col. 7 line 60 - col. 8 line 11; col. 14 line 65 - col. 15 line 27; Fig. 5; data to host/server including SYN/ACK packets).

As per Claim 26, the communication network as described in Claim 25, wherein said second BTCP module understands said proper TCP state of said front-end BTCP module in said communication session and modifies headers in response packets from said selected back-end web server reflect said proper TCP state (at least col. 7 line 60 - col. 8 line 11; modifying addresses in header).

As per Claim 27, the communication network as described in Claim 25, wherein said BIP module changes a destination address in forwarding said packets from said client (at least col. 7 line 60 - col. 8 line 11; modifying addresses in header).

As per Claim 28, the communication network as described in Claim 26, wherein said second BTCP module located at said selected back-end web server sends said response packets from said selected back-end web server to said client in a communication path that does not include said front-end node by changing headers of said response packets such that appears the source of said response packets is said front-end node (at least col. 7 line 60 - col. 8 line 11; modifying addresses in header).

Claims 11-15 do not add or define any additional limitations over claims 1 and 3-7 and therefore are rejected for similar reasons.

Claims 18-20 do not add or define any additional limitations over claims 8-10 and therefore are rejected for similar reasons.

Claim 29 does not add or define any additional limitations over claim 2 and therefore is rejected for similar reasons.

Response to Arguments

4. Applicant's arguments filed 22 December 2004 have been fully considered but they are not persuasive. Applicants argue, substantially, that Albert fails to teach a) a first bottom TCP module located below a first TCP module in a first operating system at a front-end node; b) parsing a received HTTP request to determine which of a plurality

of back-end web servers can process the HTTP request; and c) modules and a BIP module located below an IP module at the front-end node.

In response to a), Applicants arguments center around Albert not teaching a module. A module can be defined as "A self-contained functional unit which is used with a larger system. A software module is a part of a program that performs a particular task. A hardware module can be a packaged unit that attaches to a system." Albert is teaching a forwarding agent having an interface (at least Fig. 2C) and connected to a plurality of back-end nodes or servers (at least Fig. 2A) through which communication with a client is allowed, thus a front-end module or program performing a particular task directing client requests to servers and offering SYN ACK packets (BTCP) and TCP flow (at least col. 13, lines 10-29; col. 8, lines 17-39).

In response to b), Albert teaches load balancing and also a service manager. The service manager routes data packets to particular nodes and servers based on either, an affinity for a client to communicate with a particular node or server, or load balancing and directing the request from the client to a particular server depending on, as is commonly known in the art, which server is under utilized, for example. Thus, the service manager of Albert is parsing the requests and determining the appropriate server to process the request in two different manners.

In response to c), Similarly to a), Albert teaches the forwarding agent on the front-end (BIP) forwarding packets to a particular server or node based on an affinity and FIN and RST packets being communicated with the forwarding agents (at least col. 26, lines 15-50) and also teaches modules as defined above.

Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Newly cited Bellemore et al in addition to previously cited Brendel et al, Vange et al, Soderberg et al, Aviani et al, and Colby et al are cited for disclosing pertinent information related to the claimed invention. Applicants are requested to consider the prior art reference for relevant teachings when responding to this office action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregory G Todd whose telephone number is (571)272-4011. The examiner can normally be reached on Monday - Friday 9:00am-6:00pm w/ first Fridays off.

Art Unit: 2157

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ario Etienne can be reached on (571)272-4001. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Gregory Todd



Patent Examiner

Technology Center 2100



SALEH NAJJAR
PRIMARY EXAMINER